DOCUMENT RESUME

ED 278 489 PS 016 288

AUTHOR Ray, Brian D.
TITLE A Comparison of Home Schooling and Conventional Schooling: with a Focus on Learner Outcomes.
PUB DATE 29 Jul 86
NOTE 58p.; Requirements for doctoral degree, Oregon State University.
AVAILABLE FROM Brian D. Ray, Science, Math, and Computer Science Education Department, Oregon State University, Corvallis, OR 97331 ($8.00; 2 or more copies, $5.00 each).
PUB TYPE Information Analyses (070) -- Dissertations/Theses - Undetermined (040)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Academic Achievement; Comparative Analysis; *Conventional Instruction; Elementary Education; *Emotional Development; *Home Schooling; Nontraditional Education; *Outcomes of Education; *Public Schools

ABSTRACT

This review of literature compares schooling at home and in school. After definitions of home schooling and conventional schooling are supplied, general characteristics of home schools are delineated. Discussion subsequently focuses on the outcomes of home schooling. With respect to cognitive outcomes, the evidence suggests that youth educated in the home school environment will generally do as well or better than their conventional school peers. The vast majority of home school students score well above average on achievement tests. Likewise, the available empirical data suggest that home school youth are doing at least as well as those in conventional schools in terms of affective outcomes. Generally, the literature suggests that home schooling is related to positive or desirable learner outcomes. Concluding remarks offer explanations for the positive character of home schooling and suggest directions for further research. (RH)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.



ED278489

# A Comparison of Home Schooling and Conventional Schooling: With a Focus on Learner Outcomes

by

Brian D. Ray

Oregon State University

July 29, 1986

Major Professor: Thomas P. Evans

Presented in partial fulfillment of the comprehensive written examinations for the doctoral degree in the Science, Math, and Computer Science Education Department at Oregon State University.

PS 016288

Copyright © 1986 by Brian D. Ray. All rights reserved.
No part of this paper may be reproduced in any form, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from Brian D. Ray.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Brian D. Ray
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

## Introduction

A renascence of the home as the center of learning for youth has occurred recently in the United States. There is now a visible and sizeable group of people who are known as unschoolers, deschoolers, or, more commonly, home schoolers. Whereas prior to the 20th century " ... American children attended small common schools for only a few weeks each year, with attendance beginning at some point between the ages of 8 and 12" (Moore, 1985, p. 63), most children now begin attending institutions at about age six for nearly nine months per year. This is changing for many, however. Estimates of numbers of home schooling families range from 10,000 to 50,000 (McCurdy, 1985) to one million (Hewitt Research Foundation, 1986b). The number and dedication of parents and children involved in this form of learning has caused local and state departments of education, teachers, legislators, sociologists, and expert educators to take notice. Their interests and concerns include the topics of diminishing jobs for teachers, compulsory education laws (Lines, 1982, 1983; Whitehead & Bird, 1984; Altman, 1985; Wendel, 1985), less income for school districts, and quality education (Franzosa, 1984) which encompasses the cognitive, affective (Western Australia Department of Education, 1979; Washington State Superintendent of Public Instruction [WSSPI], 1985; Tizard & Hughes, 1984), and psychomotor domains. All of these issues

Copyright © 1986 by Brian D. Ray.

are legitimate in the minds of those who hold them as important. However, the purpose of this paper is not to render quiescent all of the debates regarding the above issues.

Purpose

The purpose of this literature study is to compare home schooling and conventional schooling; with a focus on student outcomes. The following topics will be discussed in this paper:

1. definition of terms,
2. characteristics of home schools,
3. home school learner outcomes,
4. summary based on available evidence, and
5. potential areas of related research.

## Definition of Terms

Since the practice of home schooling has experienced a strong renewal only in the present decade, there is not a large body of literature related to it. About 85% of the literature closely related to this investigation was published in the 80s. With the recent nature of the phenomenon and relatively few integrating papers on the topic, it is understandable that there is no set definition of home schooling. Taylor (1986) defined home schooling as "A teaching situation wherein children learn in the home in lieu of a conventional school. The parents, tutors, or guardians assume the direct responsibility for the education of their child" (p. 14). Similar definitions occur in studies such as Linden (1983) and Altman (1985). This definition can be altered to make it somewhat broader. For the purpose of this

study, the definitions that follow apply.

Home schooling. A learning/teaching situation wherein children spend the majority of the conventional school day in or near their home in lieu of attendance at a conventional institution of education. Parents or guardians are the prime educators of their children.

Conventional schooling. The customary U.S. learning/teaching situation wherein children spend the majority of the day in an educational institution (public or private). People other than parents or guardians are the prime educators of the children during the school day.

Now that the basic terms have been defined, the general characteristics of home schools will be delineated based upon the findings of five studies.

## Characteristics of Home Schools

### Gustavsen.

With the hope of revealing elements which contribute to successful home teaching, Gustavsen (1981) conducted a descriptive and analytical study that attempted to characterize home schools and the parents who operate them. He developed a 63-item survey instrument that included Likert-type responses about the home school, and other items related to demographic information which was completed by home school parents. Surveys were mailed to families in 44 states. Two hundred twenty-one, a 70.8% return rate, were returned by the cutoff date. The researcher said that they were then coded as usable or nonusable,

but he did not indicate how many were usable. Frequency distributions and measures of central tendency were appropriately used to report the findings. Gustavsen found that the typical home school had the following characteristics:

1. The female parent was mother/housewife/homemaker.

2. The male parent was a professional or skilled worker.

3. The parents had one to three years of college education, and 46% attended four years of college or had done graduate work.

4. The median household income was $15,000-$20,000.

5. Various religious backgrounds were represented, including some very untraditional ones; with 64% regularly attending religious services.

6. Parents were average socializers.

7. It was a family enterprise, usually operated by both parents.

8. An average of two children and two adults were in each household.

9. They were most common (53%) in rural and small town situations.

10. Informal, child-centered, and relatively flexible programs for learning were used.

11. The programs were effective and interesting to children (as perceived by parents).

12. For the minority who used standardized achievement tests, children rated above average.

13. The school formally convened for 3-4 hours per day.

14. Children studied on their own an average of 2.7 hours per day.

15. The home school was approved by local authorities.

16. Most often instructional materials prepared by the parents were used.

17. They had access to learning resources.

18. The curriculum covered a wide range of conventional course offerings (with math, reading, and science as the three most often stressed).

19. The home school was operated for more than two years.

20. Families decided to home school for various reasons, which follow in order of their importance: (a) concern for moral health of children, (b) concern over character development of their children, (c) " ... excess rivalry and ridicule in conventional schools ... " (p. 142), (d) overall poor quality education in public schools, and (e) desire to enjoy children at home in early years of their lives.

Linden.

In a similar vein, Linden (1983) conducted a descriptive survey of home schooling in Texas. Without detailed explanation, she reported that the sample (108) was drawn " ... so that a good cross-section of Texas was represented" (p. 27, 28). Sixty-six surveys were returned and deemed usable. The frequency distributions and measures of central tendency were appropriately used to present the data. Linden's findings agreed with characteristics 1, 5, 13, 14, 17, 18, and 20 a, b, and c listed

previously under Gustavsen's 1981 survey. Linden's findings did differ in a few ways. Corresponding to the numbers listed under Gustavsen, Linden found that:

3. The main home educator in her Texas sample had only a high school education.

4. The median household income was $10,000-$15,000.

8. There was an average of 4.74 persons per family.

9. The majority lived in suburban situations.

12. When standardized achievement tests were used, children scored equal to or above national averages.

Linden also reported that:

1. Most home schoolers lived in single family dwellings.

2. Parents controlled the television watching done by children.

3. Parents did not approve of how evolution was taught in public schools.

4. Parents perceived a lack of religious freedom in public schools.

Greene.

Greene (1984) likewise examined home school families; her survey included those in Alaska's Centralized Correspondence Study Program (CCS). CCS is a " ... complete K-12 education program delivered to students at home through the mails" (Madden, 1986, p. 3) and is operated by the Alaska Department of Education (ADE). It is open to any Alaskan resident who has not completed high school, and it is public education. A home teacher, usually

a parent, teaches the CCS student and is under the supervision of an advisory, or certificated, teacher in Juneau, Alaska (Madden). From a 457-name directory, Greene randomly selected 200 families, of which 189 were judged usable for the study. Eighty-eight completed the questionnaire (16-item for parents and 11-item for students) and returned them by the cutoff date. Greene's findings agreed with characteristics 3 (apparently), 6, 10, 18, and 20 a and b listed above under Gustavsen (1981). Greene found that 92% of the time the mother was the home teacher. Thirty-eight percent of the mothers had completed some college courses, 26% had completed high school or a G.E.D., and 24% had a four-year college degree or higher. Somewhat unlike item 9 under Gustavsen, Greene found that 26% of the families lived in areas of population 15,000 or greater and 31% of the parents reported that they did not live in a community at all. The CCS students were relatively evenly distributed from ages 5-16; with only two 17-year-olds.

Among other things, Greene (1984) also reported that reasons for being in CCS included:

1. The family lived too far from school and no bus service was available (33% of respondents).

2. The family traveled part of the year (22%).

3. The parents wanted to integrate daily practical life skills with schooling (52%).

4. Children had unhappy experiences in regular school (18%).

5. Home school was consistent with their self-sufficient

lifestyle (18%).

Washington State Superintendent of Public Instruction.

A survey was conducted of 434 parents who volunteered to be involved in a pilot study of parents as tutors, or home schooling, in Washington State (WSSPI, 1985). The results of the survey were in agreement with items 2, 3, and 8 listed above under Gustavsen (1981). The results also gave information somewhat different from Gustavsen's according to the two corresponding items below:

4. More than 55% of the families had an income of $15,000-$35,000.

9. 27% lived in areas of population 5,000 or less; while 31% lived in communities of 10,000-50,000.

In addition, the WSSPI found that:

1. 60% of the parents were 31-40 years of age.

2. 88% of the parents were women.

3. 74% of the parents were Caucasian.

Taylor.

A fifth study, that included a survey of the traits of home schools, was done by Taylor (1986). He began with a list of 45,000 potential subject families from all major geographical areas of the U.S.; from which 2,000 were randomly selected. It was estimated that 500 of these would qualify as participant families with 4th through 12th grade home school youth. Two hundred twenty-four demographic surveys and self-concept instruments (to be explained later) were returned and usable;

quite evenly representing the four major geographical regions of the U.S. The results of the 12-item demographic survey basically agreed with items 3 (14.33 years of education) and 9 listed above under Gustavsen (1981). On the other hand, corresponding to the Gustavsen items, Taylor found:

4. 47.3% of the families reported an income of at least $30,000 and 28.6% had an income of $20,000 to $29,999.

8. There was an average of 3.7 children per home school family.

Furthermore, his findings contrasted with Greene's (1984) in that most (68.3%) home school children were 9-12 years old and 29.8% were 13-17 years of age.

In addition, Taylor's (1986) findings showed that:

1. 50.4% of the home school children were male and 49.6% were female.

2. 82.6% had previously attended conventional school (which agrees with Greene (1984).

3. 5.45 years was the average age for commencement of formal instruction.

4. On the average, each child had completed 2.66 years of home school.

5. The average home school family had 2.46 children involved in the home school.

Summary

It is evident that the five studies discussed above provide various profiles of home school families. There is no

characteristic listed above under Gustavsen (1981) that was reported and agreed upon by all four reports. A clearer summary might be to say that there was no evidence contradictory to items numbered 1, 2, 5, 6, 7, 10, 11, 13, 14, 15, 16, 18, 19, and 20a through 20e listed above under Gustavsen. In addition, the last four reports presented various other characteristics of home school families and home school children.

Since Taylor (1986) is the most recent study and involved the most representative sampling of home schoolers across the country, it is suggested that it offers the most reliable characterization of the U.S. home school population with respect to the aspects with which the study dealt.

## Outcomes of Home Schooling

With a generalized description of the contemporary home school milieu in mind, a review of literature related to the outcomes of home schooling will be executed next. This will begin with a survey of the literature that is at least tangentially related to outcomes, and finish with that body of literature directly related to the learner outcomes of home schooling. The latter will concentrate on those studies which have provided empirical evidence.

### Some Evidence

Eleven years ago Moore and Moore (1975) reported that based on their review of early childhood education studies:

> The consensus of scientific evidence on the home versus the preschool is clear for the majority of children. They

> receive a better foundation for future development and learning from a secure and responsive home environment in which understanding parents are the teachers. (p. 8, 9)
>
> There is sufficient evidence from sound educational research to challenge the validity of school laws that require children to be in school before age 8, unless the home environment is intolerable. (p. 27)

Later, Moore (1985) pointed out that even the " ... principal study supporting early childhood education, the Perry Preschool Project, has for years focused more attention on the home (through weekly home visits) than has the typical early childhood education program" (p. 63). The Hewitt Research Foundation (1986c) also reported, referring to a recent study by the Frank Porter Graham Child Development Center at the University of North Carolina, that "... enrollment in high-quality preschool day-care programs and extra academic help through the first three years of school do improve the chances of disadvantaged children to do well in school" (p. 1). The Committee for Economic Development (1985) confirmed the findings that preschool programs such as the Perry and Head Start have only been clearly beneficial for children from economically " ... disadvantaged families" (p. 45, 46). Still, there is recent evidence that at least in some aspects of intellectual and social development, the lower socioeconomic groups are not handicapped at home. Some of this evidence, by the researchers Tizard and Hughes (1984), Tizard, Hughes, Carmichael, and Pinkerton (1983a), Tizard, Hughes,

Carmichael, and Pinkerton (1983b), and Tizard, Hughes, Pinkerton, and Carmichael (1982) will be discussed later.

In 1975 Moore and Moore spoke of home as being the best place for children before age eight. In 1985 Moore lengthened the time that children should remain in the home environment until perhaps the age of 10 or 12. Referring to a Hewitt Research Foundation review of more than 8,000 studies, Moore (1985) reaffirmed most of what he said in his 1982 "Research and common sense: Therapies for our homes and schools" and concluded:

> Whether the focus is on achievement, on behavior, on sociability, or on such other aspects of a child's development as the brain, the senses, cognition, coordination, or socialization, available evidence overwhelmingly suggests that, unless the child is handicapped or acutely deprived (a condition not necessarily linked to socioeconomic status), he or she should be allowed to develop physically and to explore personal fantasies and intuitions until somewhere between ages 8 and 12. . . . . Except for highly specialized clinical services, even handicapped children are best taught in their homes prior to the age of 8 or 10. (p. 63)

Although Moore and Moore have generally limited their professional journal comments lauding the home to the ages up to 10 or 12, they and Hewitt Research Foundation (Moore, 1986) do support home schooling for all ages of youth.

John Holt, a long time education analyst and critic, changed

from being one who called for school reform to one calling for "unschooling" and became, before his death in 1985, a great leader of home schooling for all ages (Holt, 1981). He and Holt Associates, Inc. have encouraged parents of children nationwide to reap the potential benefits of home schooling. For example, Holt (1983) explained that

> ... when children are allowed to decide when they will begin the exciting task of learning to read and are allowed to work out for themselves the problems of doing so ... the great majority of them learn to read much more quickly, enthusiastically, and efficiently than most children in conventional schools. (p. 393)

Many parents, writing letters to Growing Without Schooling and The Parent Educator and Family Report, have confirmed Holt's conclusion about reading and other intellectual pursuits. Holt (1983) also addressed the teacher/student outcomes of the home school setting when he wrote, based on personal experience:

> But even the most attentive, perceptive, and thoughtful classroom teachers could never elicit from their students the amount and intensity of feedback that home-schooling parents typically get from their children, because parents know and understand their childre.. so much better. (p. 393)

Holt's claim about the amount of feedback in the home school versus the conventional school was recently confirmed by Moore and Moore (1986). They cited a study done by Goodlad and deduced that each student in a public school averaged one or two personal

responses per day from his or her teacher. "In contrast, our counts of daily responses in typical home schools ranged from about 100 to more than 300" (Moore & Moore, 1986, p. 74). The Moore's figures are difficult to validate since many of them are not published within research reports.

Other claims about home schooling, based on anecdotes and a priori appeals to logic, have been and are presently being made. In 1981 Benson completed a descriptive, naturalistic report on "The development of a home school." Benson was the developer; his wife conducted the home school; their nine children were the students. Among the 10 major advantages of home schooling that he listed, the following four were particularly relevant to this paper:

1. parents having an opportunity to learn much along with their children,

2. individualized instruction, especially for gifted or slow learners,

3. flexibility, and

4. pursuit of excellence in education.

All of his conclusions about the advantages of home school were based upon his experiences and appeals to the logic of the reader. Benson reported that home school children do well on standardized tests, but no quantitative evidence was given regarding achievement, socialization, and so on. However, other reports, such as Gustavsen (1981), Linden (1983), and Greene (1984) have generally concurred with the four advantages listed

by Benson.

Divoky (1983) found that "The goal, many veteran home schoolers suggest, is to be able to get out of the way of children's learning, to simply provide an environment that allows youngsters to be self-directed" (p. 397). This goal jibes with Benson's (1981) flexibility advantage and is often reported as "attained" by parents in various home schooling publications such as Growing Without Schooling, The Parent Educator and Family Report, and The Teaching Home. Likewise, the preceding publications have included reports from numerous parents who have been in agreement with Benson's claims. The parents write that they continually delight in how much they have learned as home school parents and how much their slow and gifted learners have accelerated in their endeavors.

With respect to the "pursuit of excellence" advantage, there is growing evidence that youth who spend more time in a home school setting than in a conventional school setting may have a better opportunity to achieve excellence in learning. For example, McCurdy (1960) examined "The childhood pattern of genius" in a study supported by the Smithsonian Institution. He started with a list of 282 eminent people whose IQs had been estimated by another researcher. He chose the 27 with IQs of 160 or greater, eliminated the seven whose biographical data were too difficult to obtain, and then had 20 people to study. McCurdy's list included people such as John Stuart Mill, Blaise Pascall, Voltaire, John Quincy Adams, and William Pitt. In summary,

McCurdy wrote:

> ... the present survey of biographical information on a sample of twenty men of genius suggested that the typical developmental pattern includes as important aspects: (1) a high degree of attention focused upon the child by parents and other adults, expressed in intensive educational measures and, usually, abundant love; (2) isolation from other children, especially outside the family; and (3) a rich efflorescence of fantasy as a reaction to the preceding conditions. It might be remarked that the mass education of our public school system is, in its way, a vast experiment on the effect of reducing all three factors to a minimum; accordingly, it should tend to suppress the occurrence of genius. (p. 38)

Besides the above post hoc study of genius which elucidated childhood conditions that many claim today are similar to home schooling, there have been recent anecdotal claims about empirical evidence regarding the outcomes of home schooling. For example, McCurdy (1985) found that "A few testing programs involving home schooling have shown that these children achieve as well or better than those in schools, although the studies were not well-controlled" (p. 47). Wartes (1985) made a similar warning, about research design weaknesses, concerning achievement score results that he reported. However, the preceding scattered and anecdotal reports on home school outcomes may not satisfy all concerned, such as those in the legal and education professions.

Wendel (1985) studied the topic of "Home schooling in lieu of compulsory school attendance: Statutory and constitutional issues." He concluded that "The history of case law demonstrates that no one person or political entity has a right to educate a child unfettered by competing considerations" (p. 104). Furthermore, the researcher pointed out that the education of our youth will probably continue to be an unresolved issue. In order to assist legal and educational considerations, Wendel suggested that further research should be done to " ... determine achievement levels of home schoolers in comparison to the national norm" (p. 108).

Altman (1985) also studied the legal implications of home instruction and did this by surveying the opinions of 80 superintendents and other administrators in the Washington State. Although he included an excerpt from a cited court case in his report, "When the law treats a reasonable, conscientious act as a crime, it subverts its own power. It invites civil disobedience. It impairs the very habits which nourish and preserve the law" (p. 134), he found that those surveyed believed that home school children should be periodically administered achievement tests.

It appears that, from a legal standpoint, people want empirical evidence in order to judge whether home school families are meeting the perceived needs of a democratic society. It would seem equally reasonable that sincere educators would want to examine the observable information regarding home school outcomes. The goal of the next section of this study is to

examine the available data related to the outcomes of home schooling.

Evidence That is More Empirical

Those studies which have provided the most observable and quantitative findings will now be reviewed. First, some studies that dealt with the "preschool" ages will be presented and second, those that dealt with older youth will be considered. Within these two categories, the studies will be presented generally in chronological order, from oldest to most recent. Unless otherwise specified, the designs assigned to each study are named according to those by Campbell and Stanley (1963).

Perkel.

Perkel's (1979) purpose was to " ... determine effects on cognitive growth of home based intervention programs for four year olds from low socioeconomic and Spanish speaking backgrounds, and to compare relative effectiveness of home based and center based preschool programs" (p. 1859A). The treatment was the "Home Instruction and Teaching Program" which was administered to two selected treatment groups. The third treatment group consisted of four-year-olds randomly selected from a local preschool program and the fourth group consisted of the same age who had no preschool experience. The dependent variable was the score on the Leiter International Performance Scale (LIPS). Werner (1965) reported on the reliability and validity of the LIPS and said that it is a 60-item, nonverbal scale most suitable for ages three to eight. The norm group was

very homogeneous, composed of middle-class, mid-western, metropolitan children. Split-half reliabilities are in the .90s, but "There is a real need to determine both tester-observer and test-retest reliability ... " (Werner, 1965, p. 815). In terms of validity, it has " ... fairly high correlations with the two most widely used individual intelligence tests for children ... ," the Weschler Intelligence Scale for Children and the Stanford-Binet, with correlations at .79 to .80 and .69 to .93 (Werner, p. 815). Werner also pointed out that there is some ambiguity about "What abilities does the scale measure?" (p. 526). If it is an intelligence test, one can ask whether it is appropriate to use it as a measure of the dependent variable, since it is questionable whether a treatment can change the intelligence of a person. Perkel used the static-group comparison design. Student t-tests were employed with $p<.05$ and of the findings made, the following was relevant to this paper: "No significant differences were found in acquired cognitive skills between home based and preschool participants" (p. 1859A).

However, there are several internal and external threats to validity with the static-group comparison design (Campbell & Stanley, 1963). Among these threats are selection, mortality, interaction of selection and maturation, etc. and interaction of selection and the treatment. Another potential problem in Perkel's (1979) study was that the norm group for the LIPS appears to have been quite different from at least a major portion of the subjects used in her study. At least any threats

posed by this norming problem would be partially controlled by the fact that the same instrument was used for all in the study. Perkel's conclusions included: "(1) Home based programs can be as effective as center based programs in increasing cognitive skills" and "(3) Low socioeconomic parents can be effective teachers of their own young children" (p. 1859A). Bearing in mind the various weaknesses of the study's design, minimal confidence can be had in her conclusions.

Tizard, Hughes, Pinkerton, and Carmichael (1982).

Tizard, Hughes, Pinkerton, and Carmichael (1982) were also interested in four-year-olds as they compared adults' cognitive demands on girls at home and at nursery school. The two treatments for each girl were being at nursery school with a teacher(s) in the morning and at home with her mother in the afternoon. The independent variable was the number of cognitive demands, per each of four categories, made on the child by either the teacher or the mother. The intercoder reliability on different aspects ranged from 84% to 91%, and the content validity of the codes was explained by the authors. The static-group comparison design was used. Fifteen middle-class and 15 working-class girls were selected for the study, and all parents of the selected children agreed to participate in the study. It was reported that the working-class children were probably typical of the majority of those who attended half-day nursery school (while no such comment was made about the middle-class subjects). The statistical design was apparently a two-by-two,

two-way ANOVA, comparing home to school and middle- to working-class. The authors did not explain whether they transformed the nominal data to an interval-type form. If they did not, ANOVA was inappropriate. If they did, each child was observed in 100 "turns of talk" so an effect size of .40 could have been assigned (E. W. Courtney, personal communication, July 16, 1986). With alpha at .05 and beta at .20, the minimum sample size should have been 26 subjects per cell (Cohen, 1969); the researchers had 15.

Tizard, Hughes, Pinkerton, and Carmichael (1982) found, at statistically significant levels, that:

1. Cognitive demands were used more frequently by mothers of both social class groups than by teachers.

2. More often cognitive demands were not answered by children at school than at home.

3. There were fewer questions asked by children at school. and

4. There was no social class difference in the hourly rate, percent, or range of cognitive demands addressed to children at home or at school.

The weaknesses of the study include the previously mentioned threats to validity for the static-group comparison design, the small sample size, and the ambiguity of how the statistical analysis was executed. The researchers reported that they were careful to get homogeneous groups of girls for their study. Keeping in mind the design weaknesses, the researchers' findings are still fairly believable, because the data are so definite in

the direction of the conclusions that they made.

Tizard, Hughes, Carmichael, and Pinkerton (1983a).

Tizard, Hughes, Carmichael, and Pinkerton (1983a) also studied children's questions and adults' answers. Their aim was

> ... to see whether young children's questions, especially their "why" questions, were more frequent in certain contexts, settings [home v. nursery school] and social class groups than in others. We assumed that such questions were potentially valuable both as expressions of curiosity and also because they provided occasions for adult [sic] to enlarge the child's understanding. (p. 276)

The dependent variable included the number of questions asked by the children, nature of questions, context of the questions, and adult responses to the questions (five categories). The reliabilities between four coders ranged from 84% to 89%. The content validity of what was coded was implicitly addressed in the description of the coding procedure. This study was of the static-group comparison design; it had the same treatment, sampling matrix, and sample size as the Tizard, Hughes, Pinkerton, and Carmichael (1982) study. The sample size was adequate for the chi-square, t-test, and correlation analyses employed. Again, they did not explain whether they transformed the nominal data for the F-test. If they did, there was an average of 38 questions per child so an effect size of .25 would have been appropriate (E. W. Courtney, personal communication, July 16, 1986). With alpha at .05 and beta at .80, the minimum

sample size should have been 64 subjects per cell for the F-test (Cohen, 1969); while the study included 15 per cell.

Tizard, Hughes, Carmichael, and Pinkerton (1983a) made the following findings that are relevant to the topic of this paper:

1. Many more questions were asked by children at home than at school.

2. 10 of the 15 working-class girls asked no "why" questions at school.

3. Most children's questions were asked when the adult was stationary for a prolonged period of time and was not too busy -- a context rare at school.

4. Persistent questioning (at least 22 turns of adult-child conversation) was rare at school compared to at home.

5. " ... teachers asked a far larger proportion of questions than did mothers ... " (p. 279).

6. " ... the children seem to learn very quickly that their role at school is to answer, not to ask questions" (p. 279).

7. Most "why" questions and persistent questioning concerned non-play objects and events, especially those outside the present context; most school conversations were just the opposite.

8. Working-class girls were particularly affected by the school setting; asked fewer questions, asked more procedural questions, and exhibited less curiosity.

There were weaknesses inherent to the design, and the sample size was inadequate for the F-test. However, most of the analyses included adequate sample size and the data was clearly

supportive of the findings reported.

Tizard, Hughes, Carmichael, and Pinkerton (1983b).

Based on the same research design, sampling, and treatments as the preceding study, Tizard, Hughes, Carmichael, and Pinkerton (1983b) investigated the language use and language development of middle- and working-class four-year-old children at home and at school. The dependent variable included the complexity of the speech of the children, their use of language for complex thinking, complexity of the language of the mothers used toward their children, and children's and mothers' talk together. Eleven cognitive, and one "no code", categories were designated. The intercoder (two coders) agreement was 72% on the 11 categories and 92% for all 12 categories. Content validity was implicitly discussed in the description of the categories. The analyses of the data involved the F-test. Again, they did not explain whether they transformed the nominal data to interval-type form. If they did, the appropriate effect size for each of the three tables was .25 (E. W. Courtney, personal communication, July 16, 1986), and with alpha at .05 and beta at .80, the minimum sample size should have been 64 per cell (Cohen, 1969); while the study used 15 per cell. The sample size was adequate for the correlations done.

The following findings of Tizard, Hughes, Carmichael, and Pinkerton (1983b) are relevant to the topic of this paper:

1. Mothers used language for complex purposes more often than did teachers, when expressed as hourly rates.

2. Teachers addressed more complex language to middle-class than to working-class children.

3. Children used language for complex purposes more at home than at school.

4. The school setting reduced the working-class children's usage of complex language more than it did the middle-class children's.

5. Both adults and children had a wider range of language use at home than at school.

Again keeping in mind the weaknesses of the design and sample size for the F-test, the data were strongly in favor of the findings and conclusions reported. The researchers concluded " ... that in their own milieu [home], working class children display all the essential verbal cognitive skills" (p. 540). Furthermore, despite widespread belief in the benefits of nursery school,

" ... the evidence suggests that they [children] are much more likely to receive this [`measured attention to the child's language needs'] from their mothers" than from teachers (p. 541), and "Certainly this study suggests that children's intellectual and language needs are much more likely to be satisfied at home than at school" (Tizard & Hughes, 1984, p. 256).

The studies in this section dealt with children of ages preceding general compulsory attendance age in the U.S. Perkel (1979) found no significant difference in acquired cognitive skills between preschool and home based groups of four-year-olds.

Tizard, Hughes, Pinkerton, and Carmichael (1982) found that more cognitive demands were placed on four-year-olds at home by mothers than at nursery school by teachers. Tizard, Hughes, Carmichael, and Pinkerton (1983a) found children to ask significantly more questions at home than at school, and Tizard, Hughes, Carmichael, and Pinkerton (1983b) found significantly more complex language used at home by children and parents than at school by teachers and children. The evidence from these studies suggest that the home environment with a parent present is at least equal to and perhaps more cognitively challenging and productive for very young children than are conventional schools.

Next, studies that compared older youth (generally ages 6-17) of home schooling and conventional schooling will be reviewed.

Gustavsen.

Gustavsen (1981) analyzed his survey of 221 home school families nationwide. His study was described previously. Achievement tests (Iowa, Stanford Achievement, California, Metropolitan, and "others") were used by 40.3% of the families and he concluded that " ... children's achievement rated above average for those who reported using standardized achievement tests" (p. 143). However, this "conclusion" was not supported by any data in the study that this author could find. In addition, if parents did report this fact, there was no control on the validity of their reports.

Western Australia Department of Education.

In Australia, where many students are far from a conventional school, the Isolated Students Matriculation Scheme (ISMS) was developed by the government in order " ... to develop modern correspondence courses for rural matriculation students" (Western Australia Department of Education [WADE], 1979, p. 3). The portion of the study that was especially relevant to this paper used the Tertiary Admissions Examination (TAE) score of the students in ISMS as the dependent variable. Neither reliability nor validity data were given for the TAE. The treatments were involvement in ISMS, in which the majority of school learning was done at home, versus being in conventional schools. The static-group comparison design was utilized. In 1977, 21 ISMS students took the TAE, and 25 took it in 1978. The author simply made a qualitative statement about student performance on the test, and therefore the sample size was adequate.

WADE (1979) reported that " ... the main indicator of the Scheme's success is academic achievement," and "The overall performance of these groups [1977 and 1978] has been satisfactory" (p. 16). The term "satisfactory" was not explained. The study had the weaknesses of the static-group comparison design, and the reader is simply left to accept or reject the conclusion that ISMS students did adequately well on the system's achievement test.

Linden.

Linden (1983) (previously described) also surveyed home

school families and reported some achievement test scores. The dependent variable was each youth's score on the reading, mathematics, and language portions of the California Achievement Tests (CAT). Content validity of the CAT " ... is based largely on the procedures followed in the development of the tests" (Bryan, 1978, p. 35, 36) and "The median of the within-grade ... correlations between reading and mathematics is .75; between reading and language, .79; and between mathematics and language, .75" (Bryan, p. 36). The median alternate-form reliability coefficient for language and reading is .87 and it is .86 for mathematics (Bryan). The treatments in Linden's study were home schooling versus conventional schooling.

Linden (1983) simply listed the actual grade of each of the 16 children (whose scores were available) and the grade level that each child scored on the three CAT subjects. The youth ranged from grade 1.9 to 11.6, and the averages of their three scores were on the average 1.04 grades above their actual grade level. If a design could be assigned to the portion of the study that presented the CAT scores, it would be a very weak static-group comparison. All that can be told from the data is that the CAT scores of 16 youths were reported, and they averaged one grade level above their actual grades.

Hewitt Research Foundation.

The Hewitt Research Foundation (1985) reported that in a court case involving home schooling, "North Dakota home schoolers average about 83 percentile points on their standardized tests"

(p. 5), 22 percentiles higher than the rest of North Dakota school youth. This finding about North Dakota home school scores was later reconfirmed (Hewitt Research Foundation, 1986a). Hewitt Research Foundation (1986b) also reported:

> In a random sampling of Hewitt-Moore Child Development Center Curriculum students, including many who recently had come to home schooling from other schools, the standardized test average ranged between 78 and 80 percent, with those scoring higher who have been with Hewitt longer. This is consistent with past figures. (p. 2)

Both of the above Hewitt reports involve the static-group comparison design and neither included sample size.

Washington State Superintendent of Public Instruction.

The WSSPI (1985) planned to evaluate the implementation and success of two State Board of Education-approved " ... private experimental programs using the parent as tutor under the supervision of a certificated teacher" (p. 1). In terms of learner outcomes, the scores on the Stanford Achievement Tests (SAT) were used as the dependent variable. Ebel (1978) reported on the SAT that the

> ... split-half and K-R 20 reliability coefficients for each test at each level, for beginning, middle, and end of the grade for which each level is most appropriate. Of the 668 coefficients reported 428, or 64 percent, are .90 or above. Only 30, and all of these in Primary 1 or 2 batteries, are below .80. It is clear that these tests have satisfactory

reliability. (p. 100)

The median split-half and K-R 20 reliability for math is .89 (Begle, 1978), and "Claims for content and construct validity appear justified" (Suydam, 1978, p. 435). The treatments were involvement in the parent as tutor program versus the apparently conventional schooling of the 275,000-pupil norm group. Children " ... in a number of cities and communities across the state" were involved (WSSPI, p. 1). The study followed the static-group comparison design. The scores of 100 students, grades K-8, were analyzed and presented as percentiles. WSSPI emphasized that the reliability of the data was lowered since there were fewer than 100 students in each grade level. Presentation of percentiles was appropriate.

The K-8 children in the "parent as tutor" program averaged the following percentile scores: reading, 62; language, 56.5; and math, 53 (WSSPI, 1985). With the weaknesses of the design in mind, the reader is likely to accept the fact that " ... the majority of the scores were average, or above average, in Reading, Language and Math" (WSSPI, p. 1).

Reynolds and Williams.

The SAT (previously described) score was also used as the dependent variable to measure achievement in a case study of three families conducted by Reynolds and Williams (1985). The scores of two children were reported. The first grade child averaged seventh grade on seven test areas, and the third grade child averaged grade 8.3 on seven test areas.

Alaska Department of Education.

In the far north of the U.S. is Alaska's Centralized Correspondence Study Program (CCS) which " ... is a complete K-12 education program delivered to students at home through the mails" (Madden, 1986, p. 3), is operated by the Alaska Department of Education (ADE), open to any Alaskan resident who has not completed high school, and is public education paid for by the people of the state (Madden). A home teacher, usually a parent, teaches the student. The home teacher is under the supervision of an advisory, certificated, teacher who is located in Juneau, Alaska. The ADE has been attempting to assess the success of CCS students for several years. In one study, the ADE (1986) purposed to examine 1981 data in order to (a) assess the achievement of CCS students compared to Alaska and national norms, (b) assess the long-term effects of CCS enrollment on achievement, and (c) compare pre- and post-CCS achievement. The dependent variables were the students' scores on the CAT (form C, levels 11-19, reading and math) and on the Alaska Statewide Assessment Tests (ASA) in reading and math. The reliability and validity of the CAT were previously delineated, and overall, the " ... CAT is one of the better batteries of its kind" (Bryan, 1978, p. 37). Reliability and validity information for the ASA could not be found by this author. The treatments were involvement in CCS home schooling versus conventional schooling. Generally, the static-group comparison design was employed. In addition, the one-group pretest-posttest design was

used to approach purpose 3 of the study. First the results and analyses dealing with the CAT will be reviewed.

The CAT reading scores for CCS grades 1-3 were .58 to 1.31 standard deviations (SD) higher than the norm. Grades 4-8 reading scores were .67 to 1.12 SD higher than the norm. Grades 1-8 math scores of children taught at home were .42 to 1.13 SD higher than the norm, with the exception of grade five which was .21 SD higher than the norm. It appears that the Kilmogorov-Smirnov one-sample test was appropriately used (Hays, 1963) with adequate sample sizes. The CCS student scores were significantly ($p<.01$) higher than the theoretical distribution. Three other findings follow:

1. Those 4-8 grade students in CCS two years or more scored significantly higher on the CAT than those in it less than two years (t-test, $p<.05$) (.61 SD higher in math and .83 SD higher in reading).

2. The scores of 4-8 grade students after CCS involvement were significantly greater than before CCS study (t-test, $p<.05$) (.29 SD greater in math, and .43 SD greater in reading).

3. On the ASA, CCS students scored higher than the Alaska averages in reading and math (by 14.27% in fourth grade reading and by 8% in eighth grade reading; by 7.7% in fourth grade math and by 6% in eighth grade math).

The weaknesses of the static-group comparison have already been mentioned; while the threats to validity in the one-group pretest-posttest part of the study are even more numerous

(Campbell & Stanley, 1963). However, the CAT is valid and reliable. Appropriate statistics were used, and adequate samples were involved. It can be safely concluded that for the types of students involved in CCS, the program at least kept them on par with their state and national peers in terms of math and reading achievement.

The ADE (1984) summarized the Science Research Associates (SRA) test scores of the CCS students in the spring of 1984. The dependent variables were math and reading scores on the SRA. SRA (1981) reported that the composite test score (used by ADE) K-R 20 reliabilities ranged from .92 to .99. In terms of validity, scores on the SRA correlate with students' course grades in the range .43-.79, which is " ... consistent with the magnitude of relationships expected ... " (SRA, p. 55). Correlations with other achievement test batteries' total scores " ... were in the .80s and .90s, and the individual test scores were in the .70s and .80s" (SRA, p. 61). The design of the study was the static-group comparison; with 53% (apparently 354 tested; unclear reporting) of the April of 1984 students being tested. Simple percentiles were presented. The results for the 22% of the CCS students who were tested "on-site" (not at home) were as follows:

1. " ... 9 of the 12 grades fell above the 75th percentile in reading ... " (ADE, p. 1).

2. 8 of 12 grades fell above the 60th percentile in language.

3. 9 of the 12 grades fell above the 60th percentile in math

(ADE).

When one includes the CCS students tested at home, their composite test scores were even higher than those just listed (ADE, 1984).

The ADE (1985) again assessed the CCS home schooled youths' achievement in the spring of 1985. The dependent variables were scores on the SRA reading, math, language, and science tests and scores on the ASA reading and math tests. These two instruments were previously discussed. The static-group comparison design was used with adequate sample size (at least 16 at each grade level) for the presentation of percentiles. Figure 1 represents the ASA scores collated over a five-year period. In terms of

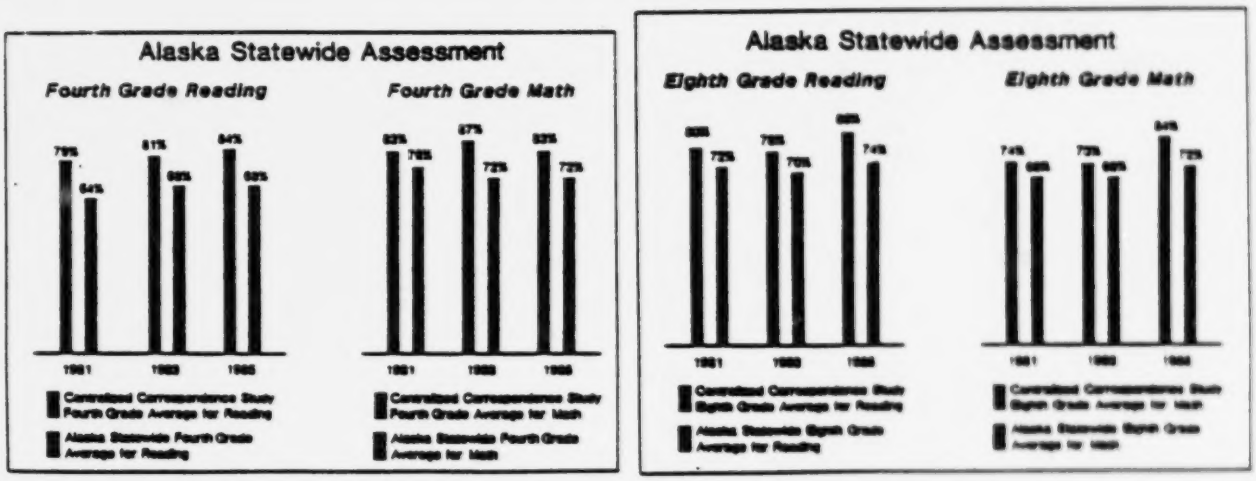


Figure 1. Alaska Statewide Assessment, 1981-1985. (From Falle, 1986, p. 2)

1985 SRA data, the following grades and corresponding subjects were considered: K, 1 - reading and math

2, 3 - reading, math, and language

4-11 - reading, math, language, and science.

The following findings were reported:

1. For grades K-6, CCS students scored at least six percentiles higher than conventionally schooled Alaskans on all comparisons; with the majority of these above the 80th percentile of the SRA norm.

2. For grades 7-11, CCS students were 2-27 percentiles higher than Alaska user norm on 17 comparisons and equal on three comparisons; with the majority of these at or above the 70th percentile of the SRA norm.

It appears that the home schooling of CCS has allowed students to achieve at least as well as their Alaskan peers and better than national norms. Falle (1986) discussed the fact that the ADE is attempting to develop more reliable means of administering standardized tests to home schooled children. Nevertheless, he did not indicate that this reliability issue was a major obstacle to accepting as valid the superior achievement of CCS students.

The preceding studies represent most of what has been done in terms of critical analyses of the cognitive achievement of home school youth. The available evidence indicates that home school youth of compulsory education age score equal to or better than their conventional school peers on measures of cognitive

achievement. This statement is made while keeping in mind the limitations of the static-group comparison design; which was generally the design of the studies discussed in this section. There is no complete assurance that the home and conventional school groups were homogeneous in nature. It is quite clear, however, that the overall phenomenon (the combination of the type of youth involved in home school and the home school "treatment") is not inhibiting the youth from matching or excelling average conventional school achievement.

A very different, and yet interesting and controversial, area deals with the affective development of home school children. Socialization is the affective dimension most frequently mentioned in discussions or debates concerning home centered learning.

In its report on the ISMS, WADE (1979) made the qualitative conclusion:

> Students working by themselves or in small groups are severely handicapped socially. The social interaction experienced at camps [provided by ISMS] is good for all students, but those students attending large schools daily have an obvious advantage in this regard. (p. 19).

Likewise, concern for socialization of home school children was evident in the "parent as tutor program" in Washington (WSSPI, 1985). Tizard and Hughes (1984) mentioned that some of the educational needs of children cannot be met within the home; for example, " ... how to get on with other children, to be a member

of a group, to separate from their families, and to relate to, and communicate with, strange adults" (p. 259). Statements such as the above ones are basically appeals to a priori knowledge. Some empirical evidence might be helpful in the discussion.

Taylor.

A study was recently completed that attempted to partially address concerns about socialization. Taylor (1986) " ... sought to analyze the relationship which exists between home schooling and the self-concept of children in grades four through twelve" (p. 5). Taylor perceived self-concept as a relevant construct in that it " ... is closely linked with values, social competence, and self-evaluation" (p. 53) and achievement. Furthermore, most students of learning realize that the importance of positive self-concept to effective learning is clearly emphasized in education's contemporary writings (Travers, 1982; Carin & Sund, 1985).

Taylor (1986) used the youths' scores on the Piers-Harris Self-Concept Scale (PHSCS) as the dependent variable. It is an 80-item, self-report instrument used to measure self-concept in children and adolescents; it is normed for children grades 4-12. In terms of reliability, its internal consistency is .90, and the median of reported test-retest reliability scores is .73. The six subscale reliabilities are considerably lower than for the total (global) score. The predictive validity of the PHSCS has been reported at .56 and .61. Taylor cited several studies that have said that the PHSCS is a valid measure of the central core

of personality. In addition, the convergent validity between the PHSCS and four other similar instruments has ranged from .60 to .71. The instrument was normed to public school youth. Taylor (1986) rendered a detailed study of the PHSCS and made the statements about it that are reported in this paper.

The treatments in the study were home school and conventional public school. The design basically followed the static-group comparison paradigm. The sampling done by Taylor (1986) was previously explained in this paper; 224 fourth through twelfth grade home schooled youth from all about the U.S. were studied. The sample size was adequate for the t-tests done. For multiple regression, a minimum of 14 subjects for the first variable and 10 for each variable thereafter are needed (E. W. Courtney, personal communication, July, 1986). Therefore, Taylor needed a minimum of 144 for his 14 predictor variables; his sample of 224 was more than adequate.

Some of Taylor's (1986) various findings follow:

1. The self-concept of home school youth was significantly higher (t-test, $p<.001$) than that of conventional school youth for the global and all six subscale scores.

2. The home school global score was 1.0 SD higher than for the conventional school youth.

Taylor stated, "Insofar as self-concept is a reflector of socialization ... [references given], the findings of this study would suggest that few home-schooling children are socially deprived" (p. 160, 161). In addition, Taylor pointed out that

his findings jibed with those of others who have studied home school families.

Again, the weaknesses of the static-group comparison design have been previously listed. However, Taylor (1986) used appropriate statistics, had a more than adequate sample size, and was careful to obtain a representative and as close as possible to a random sample as he could. All aspects of the study considered, the results are clear and believable as representative of the home school youth who were studied.

No studies were located that relate to the psychomotor development of home school youth compared to conventional school youth. Next a summary will be offered.

## Summary

## Based on Preceding Studies

### Characteristics of Home School Families

It is apparent that a wide variety of individuals are involved in home schooling; just as the U.S. is comprised of a pluralistic group. Home school involves: agnostics, Christians, Mormons, five and 17-year-olds, low- and high-income families, Blacks, Orientals, and Caucasians, parents with Ph.D.s and parents with G.E.D.s, and one-child and 10-children families. However, an attempt to normalize the various individuals and their home schooling would generally yield, among others, the following characteristics:

1. Both parents are actively involved; with the mother/homemaker as the teacher most of the time.

2. Parents have attended or graduated from college.

3. Total household income is $20,000-$30,000.

4. Over 60% regularly attend religious services.

5. Three children are in the family.

6. The learning program is flexible and highly individualized, involving both homemade and purchased curriculum materials.

7. Children are formally "schooled" 3-4 hours per day, and often spend extra time in individual learning endeavors.

8. They study a wide range of conventional subjects, with an emphasis on math, reading, and science.

9. The home school is operated for more than two years.

10. Home school is chosen for various reasons, including both cognitive and affective ones.

There is nothing in the research to suggest that home school families, as a group, are bizarre with respect to the characteristics listed above. One trait that is usually implied, and occasionally explicit, in the literature is that the parents who home school their children are extremely interested in and concerned about the total education of their children. In conjunction with this trait, they perceive that they, as parents and guardians, have prime responsibility for the education of their young. "And they are willing to be different, to take a socially unorthodox route to rearing the kind of children they want" (Divoky, 1983, p. 397).

Learner Outcomes

There have also been at least 11 studies that supply empirical evidence that is directly related to the learner outcomes of home schooling. Perkel (1979) found for low socioeconomic and Spanish speaking four-year-olds that cognitive skill could be increased as well at home as at school. Four-year-olds, of both the working and middle classes, were also studied by researchers in Great Britain. Tizard, Hughes, Pinkerton, and Carmichael (1982) found that significantly more cognitive demands on children were made at home than at school and children asked more questions at home than at school. Tizard, Hughes, Carmichael, and Pinkerton (1983a) found that teachers asked a significantly greater proportion of questions than mothers, and children learned quickly that their role at school was to answer, not ask, questions. Tizard, Hughes, Carmichael, and Pinkerton (1983b) also found, at significant levels, that children more frequently used complex language at home than at school.

Home school students of high school age in Western Australia performed satisfactorily on achievement tests (WADE, 1979) and Linden (1983) reported above-average scores on the CAT for children of various grade levels. Hewitt Research Foundation (1986b) consistently finds home school students to score in the 70 and 80 percentiles on standardized achievement tests.

In a study involving a more controlled design, K-8 grade home school children scored above (3%-12%) the national average

on the SAT in reading, language, and math (WSSPI, 1985). Youth in a state-managed form of home schooling in Alaska have been scoring significantly higher than conventional schooled youth on the CAT in math, reading, language, and science (ADE, 1984, 1985, 1986; Falle, 1986). The CCS home schooled in Alaska also score higher on achievement tests than conventional schooled Alaskans (ADE, 1985, 1986; Falle, 1986).

Taylor (1986) has provided the only study which carefully examines and offers data regarding the affective component of learning. He found that home school youth scored significantly higher than conventional school youth on the global and all six subscales of the Piers-Harris Self-Concept Scale.

With respect to cognitive outcomes, then, the evidence suggests that those youth educated in the home school environment will generally do as well or better than their conventional school peers. The vast majority of home school people score well above average on achievement tests. The evidence in the studies analyzed in this paper is generally reliable. Furthermore, no evidence to the contrary could be found.

Likewise, the available empirical data suggest that home school youth are doing at least as well as those in conventional schools in terms of affective outcomes. Although very limited measured evidence exists regarding the values, attitudes, and socialization of home school youth, no tangible evidence was identified that they are inferior to conventional school youth in these areas.

The findings regarding home school learner outcomes are thus far based upon pre-experimental (Campbell & Stanley, 1963), causal comparative, and correlational research paradigms. It is difficult, although perhaps not impossible, to start with equivalent samples of youth when involved in an attempt to compare home school and conventional school "treatments." It is possible to hypothesize that the home school treatment is a causal factor of apparently elevated achievement and self-concept scores, but the research to date cannot be said to come close to proving such an hypothesis.

Possible Explanations for Observed Home School Outcomes

A review of the literature suggests that, in general, home school is related to positive or desirable learner outcomes. If this is true, it is interesting and perhaps worthwhile to speculate as to why home school might enhance, or at least not be a detriment to, learner outcomes. Following are some potential explanations:

1. Home school provides an extremely low student:teacher ratio, usually 1 to 3:1. This allows for a tremendous amount of child-adult interaction, feedback, and behavior reinforcement in the learning setting.

2. Parents are highly involved in their children's learning, and what happens at home is clearly related to learning success (Keeves, 1975; Travers, 1982; U. S. Department of Education, 1986).

3. Parents are "significant others" to their children, and

the children will value their parents' behavior enough to imitate it. Parents who home school place high value on learning and not only value teaching their young but also enthusiastically learn themselves. Extra attention from parents may raise the self-concept of children, which is associated with improved learning. Also, many home schooling parents personally experience a renewal of interest in learning. It may be likely that children will follow the model of their parents in this regard.

4. Some children who are labeled "disadvantaged" (socioeconomically) may actually be benefitted by staying at home for several years rather than going to a conventional school. Tizard and Hughes (1984) concluded, "Far from compensating for any inadequacies of their home, the staff were in fact lowering their expectations and standards for the working-class children" (p. 257). The milieu of the conventional school may often discriminate against lower socioeconomic children. It has been found that higher expectations of youth by adults, perhaps more likely at home for many children, result in greater academic performance by learners (Travers, 1982; U. S. Department of Education, 1986).

5. At home, " ... the learning is often embedded in contexts of great meaning to the child" (Tizard & Hughes, 1984, p. 251), and the home schooled are frequently involved in learning within the framework of daily living activities. This setting is similar to some aspects of the quality, educative experiences and "learning by doing" that Dewey (1938) encouraged and the active

involvement in learning by discovery that Piaget and Bruner have emphasized (Carin & Sund, 1985).

6. Home school lends itself to a high degree of individualization and flexibility in terms of "curriculum" for each student. The unique characteristics of each child, whether a deficit or an asset compared to the norm, can be addressed and dealt with on a daily basis without the hindrances of institutional life and operations. Even if the average home school child spends as much as three hours in "formal" or planned learning activities, he or she is still afforded four or five more hours of the conventional school day to engage in a great variety of cognitive, affective, and psychomotor learning activities (Reynolds & Williams, 1985; Gustavsen, 1981; Linden, 1983).

7. Parents at home frequently exhibit behaviors that have consistently appeared in the literature on teacher effectiveness. Among these characteristics of effective teachers are (a) teacher variability, viz. the parents use many different methods to teach their children, (b) enthusiasm, (c) task orientation, viz. once the learner is on a task, they have him or her take the time to complete it; which is what many home schoolers find they are able to do with their flexible schedules, and (d) clarity and organization in instruction to the student; which is perhaps easier for home school teachers since they have so few students (Medley, 1982; T. P. Evans, personal communication, April 30, 1984). Each of the preceding seven ideas concerning the apparent

desirable learner outcomes of home school could entail a lengthy study in itself. At best, the research regarding home school youth is slight. Nevertheless, should more research be done regarding this option in U. S. education?

## Research Potentials

Stephen Arons (1983), an expert in legal studies, did a careful legal and philosophical analysis of book censorship, home schooling, and educational subcultures in Compelling belief: The culture of American schooling. He proposed some provoking questions:

> If a child is in school six hours each day for twelve years merely as a logical result of changes in the social and economic structure over the last 200 years, why do a few thousand families seeking to educate their children at home evoke such virulent official reactions and such widespread public attention? Why is it that millions of children who are pushouts or dropouts amount to business as usual in the public schools, while one family educating a child at home becomes a major threat to universal public education and the survival of democracy? (p. 88)

It would seem that educators, legislators, state departments of education, parents, and others would want more empirical data regarding home schooling before they further laud or denigrate its potentials. The fact that, contrary to Aron's figure, perhaps far more than 50,000 families are presently educating their children at home makes research even more important.

Some of the various suggestions for further research follow:

1. Compare more carefully the academic achievement scores of home and conventional school students (Linden, 1983; Wendel, 1985; Taylor, 1986).

2. Investigate socialization aspects of home school compared to conventional school (Linden, 1983).

3. Develop a profile of the types of programs and materials used by home schoolers (Linden, 1983).

4. Survey attitudes of school administrators (Linden, 1983), certified teachers, education specialists, and the public toward home school.

5. Study the effect of teacher certification of home school teachers (Wendel, 1985) or education courses taken by home school teachers on student achievement.

6. Investigate possible uses of television, computers, and other forms of technology in the home school (Wendel, 1985).

7. Conduct a longitudinal study tracing " ... the self-concept of home schooling children both before and subsequent to their re-entry into a conventional school system" (Taylor, 1986, p. 191).

8. Profile the lives of home schooled people after high school graduation age (R. Smith, personal communication, July 1, 1986).

Furthermore, it would be of interest to science educators to have information concerning the scientific development of home school youth. To date, there is scanty information about the

achievement of these learners on standardized science tests. The ADE (1985) reported that CCS home school fourth through eleventh grade students scored, on the average, 15.1 percentiles higher (68th to 90th percentile) than their conventional school Alaskan peers on the SRA science test. The only other information on the science achievement of these youth was provided by an anthropologist. M. A. Pitman (personal communication, June 26, 1986) administered the Metropolitan Achievement Test to a small number of home school youth in Ohio, and they scored above average on the science portion of the test. In addition, this author is not aware of any information regarding the scientific literacy (Showalter, 1974; National Science Teachers Association, 1982) of home school learners.

It would be helpful, to home schoolers and to society in general, to (a) determine whether there is a significant relationship between whether a learner is home schooled or conventional schooled and at least one aspect of their scientific literacy and (b) determine whether there is a significant relationship between type of schooling (home or conventional) and scores on science achievement tests.

Among other things, such research might reveal to educators whether more energy should be given to educating parents (Becher, 1982; Moore & Moore, 1986), to " ... what professionals can learn from studying parents and children at home" (Tizard & Hughes, 1984, p. 267), or to a more efficient homeostasis of the two. In fact, it might one day be realized by many that perhaps the home

schooling movement is

> ... a laboratory for the intensive and long-range study of children's learning and of the ways in which friendly and concerned adults can help them learn. It is a research project, done at no cost, of a kind for which neither the public schools nor the government could afford to pay. (Holt, 1983, p. 393)

## References

Alaska Department of Education. (1984). Summary of SRA testing for Centralized Correspondence Study April/May 1984. Juneau, AK: Author.

Alaska Department of Education. (1985). SRA survey of basic skills, Alaska Statewide Assessment, Spring of 1985. Juneau, AK: Author.

Alaska Department of Education. (1986). Results from 1981 CAT [for CCS]. Juneau, AK: Author.

Altman, M. D. (1985). Legal implications of home instruction with emphasis on the State of Washington. Unpublished doctoral dissertation, Washington State University, Washington.

Arons, S. (1983). Compelling belief: The culture of American schooling. Amherst, MA: The University of Massachusetts Press.

Becher, R. M. (1982). Parent education. In H. E. Mitzel (Ed.), Encyclopedia of educational research. New York, NY: The Free Press.

Begle, E. G. (1978). Stanford Achievement Test: Mathematics. In O. K. Buros (Ed.), The eighth mental measurements yearbook (pp. 433, 434). Highland Park, NJ: The Gryphon Press.

Benson, R. A. (1981). The development of a home school (Doctoral dissertation, Brigham Young University, 1981).

Dissertation Abstracts International, 42, 671A.

Bryan, M. M. (1978). California Achievement Tests, 1970 Edition. In O. K. Buros (Ed.), The eighth mental measurements yearbook (pp. 35-37). Highland Park, NJ: The Gryphon Press.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Boston, MA: Houghton Mifflin Co.

Carin, A. A., & Sund, R. B. (1985). Teaching science through discovery. Columbus, OH: Charles E. Merrill Publishing Co.

Cohen, J. (1969). Statistical power analysis for the behavioral sciences. New York, NY: Academic Press.

Committee for Economic Development. (1985). Investing in our children. New York, NY: Author.

Dewey, J. (1938). Experience and education. New York, NY: Macmillan Publishing Co., Inc.

Divoky, D. (1983). The pioneers of the home-schooling movement. Phi Delta Kappan, 64, 395-398.

Ebel, R. L. (1978). Stanford Achievement Test, 1973 Edition. In O. K. Buros (Ed.), The eighth mental measurements yearbook (pp. 98-102). Highland Park, NJ: The Gryphon Press.

Falle, B. (1986). Standardized tests for home study students: Administration and results. Method: Alaskan Perspectives, 7, 22-24.

Franzosa, S. D. (1984). The best and wisest parent: A critique

of John Holt's philosophy of education. Urban Education, 19, 227-244.

Greene, S. S. (1984). Home study in Alaska: A profile of K-12 students in the Alaska Centralized Correspondence Study Program. (ERIC Document Reproduction Service No. ED 255 494)

Gustavsen, G. A. (1981). Selected characteristics of home schools and parents who operate them (Doctoral dissertation, Andrews University, 1981). Dissertation Abstracts International, 42, 4381A, 4382A.

Hays, W. L. (1963). Statistics for psychologists. New York, NY: Holt, Rinehart, Winston, Inc.

Hewitt Research Foundation. (1985). North Dakota trial results pending. The Parent Educator and Family Report, 3(2), 5.

Hewitt Research Foundation. (1986a). Study of home schoolers taken to court. The Parent Educator and Family Report, 4(1), 2.

Hewitt Research Foundation. (1986b). On home-schooling figures and scores. The Parent Educator and Family Report, 4(2), 1,2.

Hewitt Research Foundation. (1986c). Disadvantaged preschoolers make gains. The Parent Educator and Family Report, 4(3), 1.

Holt, J. C. (1981). Teach your own. New York, NY: Delacorte Press/Seymour Lawrence.

Holt, J. C. (1983). Schools and home schoolers: A fruitful partnership. Phi Delta Kappan, 64, 391-394.

Keeves, J. P. (1975). The home, the school, and achievement in mathematics and science. Science Education, 59, 439-460.

Linden, N. J. F. (1983). An investigation of alternative education: Home schooling (Doctoral dissertation, East Texas State University, 1983). Dissertation Abstracts International, 44, 3547A.

Lines, P. M. (1982). State regulation of private education. Phi Delta Kappan, 64, 119-123.

Lines, P. M. (1983). Private education alternatives and state regulation. Journal of Law and Education, 12, 189-234.

Madden, M. M., Ed. (1986). Home study by correspondence. Method: Alaskan Perspectives, 7(1).

McCurdy, H. G. (1960). The childhood pattern of genius. Horizon: A magazine of the arts, 2(5), 32-38.

McCurdy, J. (1985). Choices in schools: What's ahead and what to do. Arlington, VA: National School Public Relations Association.

Medley, D. M. (1982). Teacher effectiveness. In H. E. Mitzel (Ed.), Encyclopedia of Educational Research (5th ed.) (pp. 1894-1903). New York, NY: The Free Press.

Moore, R. S. (1982). Research and common sense: Therapies for our homes and schools. Teachers College Record, 84, 355-377.

Moore, R. S. (1985). It depends on your aim. Phi Delta Kappan, 67, 62-64.

Moore, R. S. (1986). A visit with Dave Colfax. The Parent

Educator and Family Report, 4(1), 2.

Moore, R. S., & Moore, D. N. (1975). Better late than early. New York, NY: Reader's Digest Press.

Moore, R. S., & Moore, D. N. (1986). When education becomes abuse: A different look at the mental health of children. Journal of School Health, 56(2), 73-75.

National Science Teachers Association. (1982). Science-technology: Science education for the 1980s. Washington, D. C.: Author.

Perkel, F. E. (1979). The effects of a home instruction program on the cognitive growth of a selected group of 4-year olds (Doctoral dissertation, University of Southern California, 1979). Dissertation Abstracts International, 40, 1859A.

Reynolds, P. L., & Williams, D. D. (1985). The daily operations of a home school family: A case study. Paper presented at Annual Meeting of American Educational Research Association, 1985. (ERIC Document Reproduction Service No. ED 256 080.

Science Research Associates. (1981). SRA achievement series, technical report #3. Chicago, IL: Author.

Showalter, V. (Ed.) (1974). Processes of science. Prism II. Columbus, OH: The Ohio State University.

Suydam, M. N. (1978). Stanford Achievement Test: Mathematics Tests, 1973 Edition. In O. K. Buros (Ed.), The eighth mental measurements yearbook (pp. 434, 435). Highland Park, NJ: The Gryphon Press.

Taylor, J. W., Fifth. (1986). Self-concept in home-schooling

children. (Doctoral dissertation, Andrews University, 1986).

Tizard, B., & Hughes, M. (1984). Young children learning. Cambridge, MA: Harvard U. Press.

Tizard, B., Hughes, M., Carmichael, H., & Pinkerton, G. (1983a). Children's questions and adults' answers. Journal of Child Psychology and Psychiatry, 24, 269-281.

Tizard, B., Hughes, M., Carmichael, H., & Pinkerton, G. (1983b). Language and social class: Is verbal deprivation a myth? Journal of Child Psychology and Psychiatry, 24, 533-542.

Tizard, B., Hughes, M., Pinkerton, G., & Carmichael, H. (1982). Adults' cognitive demands at home and at nursery school. Journal of Child Psychology and Psychiatry, 23, 105-116.

Travers, R. M. W. (1982). Essentials of learning (5th ed.). New York, NY: Macmillan Publishing Co., Inc.

United States Department of Education. (1986). What works: Research about teaching and learning. Washington, D. C.: Author.

Wartes, J. (1985). One educator's observations about homeschooling. Unpublished manuscript.

Washington State Superintendent of Public Instruction. (1985). Washington States's experimental programs using the parent as tutor under the supervision of a Washington State certificated teacher, 1984-1985. Olympia, WA: Author.

Wendel, J. (1985). Home schooling in lieu of compulsory school attendance: Statutory and constitutional issues. (Doctoral

dissertation, Kent State University, 1985).

Werner, E. E. (1965). Leiter International Performance Scale. In O. K. Buros (Ed.), The sixth mental measurements yearbook (pp. 814-816). Highland Park, NJ: The Gryphon Press.

Western Australia Department of Education. (1979). Innovations in rural education: The Isolated Students Matriculation Scheme in Western Australia and the Chidley Educational Centre. Western Australia: Author.

Whitehead, J. W., & Bird, W. R. (1984). Home education and constitutional liberties. Westchester, IL: Crossway Books.